SOUTH AFRICAN SUGAR INDUSTRY

AGRONOMISTS' ASSOCIATION

8100/3 STALK ELONGATION MONITORING

TERMINAL REPORT

Cat. No. 1508

Object: To monitor stalk growth in selected stands of NCo 376 to determine the onset of rapid stalk elongation (NB. This exercise was done to compliment 4200/13 : Post-harvest Irrigation Trial, where treatments were defined relative to the onset of rapid stalk elongation).

Duration of Investigation: Mid-May, 1985 to mid-January, 1986.

Location: The following sites on ZSA Experiment Station were chosen to represent each month of the 1985 cutting season on the Station:

Month of harvest	Trial No.	Ratoon	Site
May	8800/1a	1R	D 1-3
June	2170/1a	1R	M4
July	2140/5	1R	S6
August	2120/7	1R	Z2
September	2150/3	2R	Z4
October	2160/2(L)	1R	K2
November	6400/22	5R	K4

Soil type: Predominantly PE.1 sandy clay loam derived from gneiss.

Design: Non-statistical observational trial.

Variety/Spacing: NCo 376, 1,5 m between rows.

Conduct:

1. An area of 30 m^2 of cane (20 m of cane row) was selected from a guard area or control plot of NCo 376.
2. Within the 30 m^2, 50 tillers were selected at random and tagged two weeks after emergence.
3. At regular intervals tiller heights and canopy cover measurements were taken and the number of unfurled leaves were counted.

RESULTS

a) Determination of onset of rapid stalk elongation.
Figure 1 shows the change in tiller height with time. The onset of rapid stalk elongation is indicated by an arrow. It was determined by looking for a point on the graph where there was a sudden steep rise. This change in gradient was more pronounced in Figure 1b (August to November-cut cane) than in Figure 1a (May to July-cut cane).

b) Effects of temperature on stalk elongation.
In Figure 1, below the graphs of tiller heights, the mean daily air temperature was plotted. Tillers in May and June-cut cane started to elongate rapidly from 2nd September, 1985. This corresponds to the first sharp rise

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in temperature after winter. In the third week of September, temperatures dropped suddenly only to rise again at the end of September. The onset of rapid stalk elongation in July and August-cut fields coincided with this second rise in temperature. Thereafter temperatures stayed high at a mean air temperature of approximately 25°C, and did not appear to inhibit stalk elongation.

c) Effect of leaf numbers on the onset of rapid stalk elongation.
Table 1 shows the number of unfurled leaves per tiller at the onset of rapid stalk elongation. Cane harvested from August to November started to elongate rapidly when tillers had 4-6 unfurled leaves. Cane cut in May, June and July had more leaves than this when it started to elongate. This was because low winter temperatures prevented rapid stalk elongation.

d) Effect of % canopy cover on the onset of rapid stalk elongation.
Percentage canopy cover figures at the start of rapid stalk elongation followed a similar trend to leaf numbers (see Table 1). Canopy cover figures were erratic due to a higher margin of error in their measurement than leaf numbers. Therefore it is not possible to draw a relationship between percentage canopy cover and the onset of rapid stalk elongation.

e) Time taken from harvest to start of rapid stalk elongation (see Table 1)
This time varied from 121 days for cane harvested in May to 28 days for cane harvested in September. On average, August to November-cut cane started to elongate rapidly, only 33 days after cutting. Figure 2 shows the time taken by each crop to reach the rapid stalk elongation phase plotted against its respective harvest date. This time drops sharply from the May-harvest to the August-harvest, after which there is little change.

DISCUSSION

In previous growth studies done at ZSA Experiment Station (7000/2 and 7000/3) it was reported that there were two conditions which determined the onset of rapid stalk elongation, viz.
a) Mean daily temperatures had to be above 18,5°C.
b) Primary tillers had to have a minimum of 5 unfurled leaves.
Results verify these observations especially with regard to the minimum requirement of five unfurled leaves. As for the threshold temperature of 18,5°C, the results suggest that a value of 20°C would be more accurate for this season.

The method of measuring canopy cover needs to be improved by:
a) Taking more readings over a larger area.
b) Mounting the device for measuring percentage canopy cover higher up as cane grows taller.

The curve in Figure 2 provides a means of predicting the onset of rapid stalk elongation for any given time of harvest between May and November. These results should be used with caution as they represent only one seasons' work.

3/CONCLUSION.....

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These results will serve their purpose in defining the treatments for 4200/13 : Post-harvest Irrigation Trial. A similar investigation to this will be continued this season, and the data from two seasons' work should enable fairly accurate prediction of the onset of rapid stalk elongation for any given harvest date.

DEL/Jan'86
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TABLE 1 : EFFECTS OF LEAF NUMBERS AND % CANOPY COVER ON THE ONSET OF RAPID STALK ELONGATION.

MONTH OF CUT	HARVEST DATE	ONSET OF RAPID STALK ELONGATION			TIME FROM HARVEST TO ONSET OF RAPID STALK ELONGATION IN	
		DATE	LEAF NO. ON THAT DATE	% CANOPY COVER ON THAT DATE	(a) DAYS	(b) WEEKS
MAY	21/ 5/85	2/ 9/85	10	65	121	17,3
JUNE	17/ 6/85	2/ 9/85	9	70	77	11,0
JULY	22/ 7/85	26/ 9/85	8	52	66	9,4
AUGUST	19/ 8/85	27/ 9/85	5	23	39	5,6
SEPTEMBER	10/ 9/85	8/10/85	4	33	28	4,0
OCTOBER	14/10/85	21/11/85	6	42	37	5,3
NOVEMBER	11/11/85	9/12/85	5	20	29	4,1

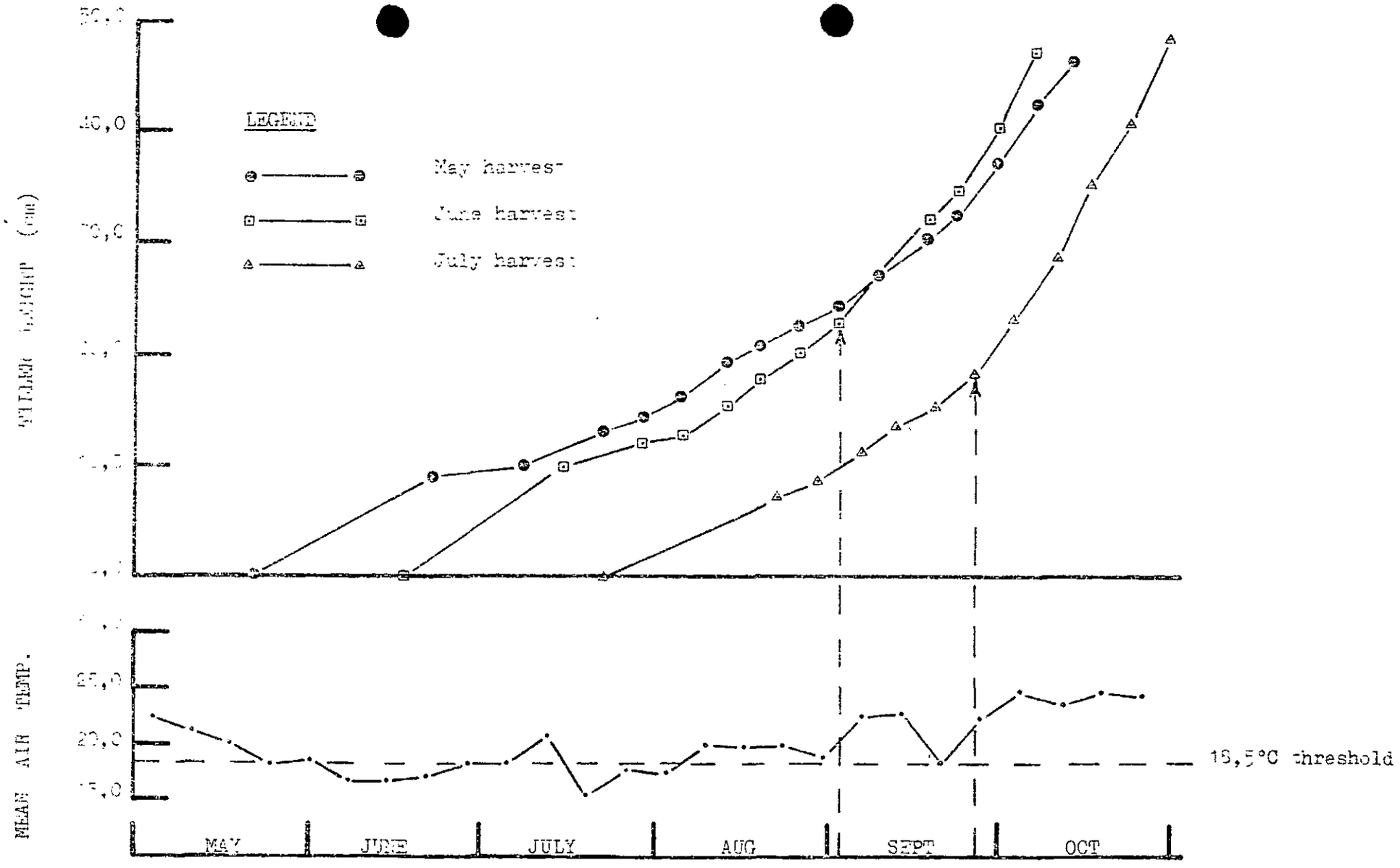
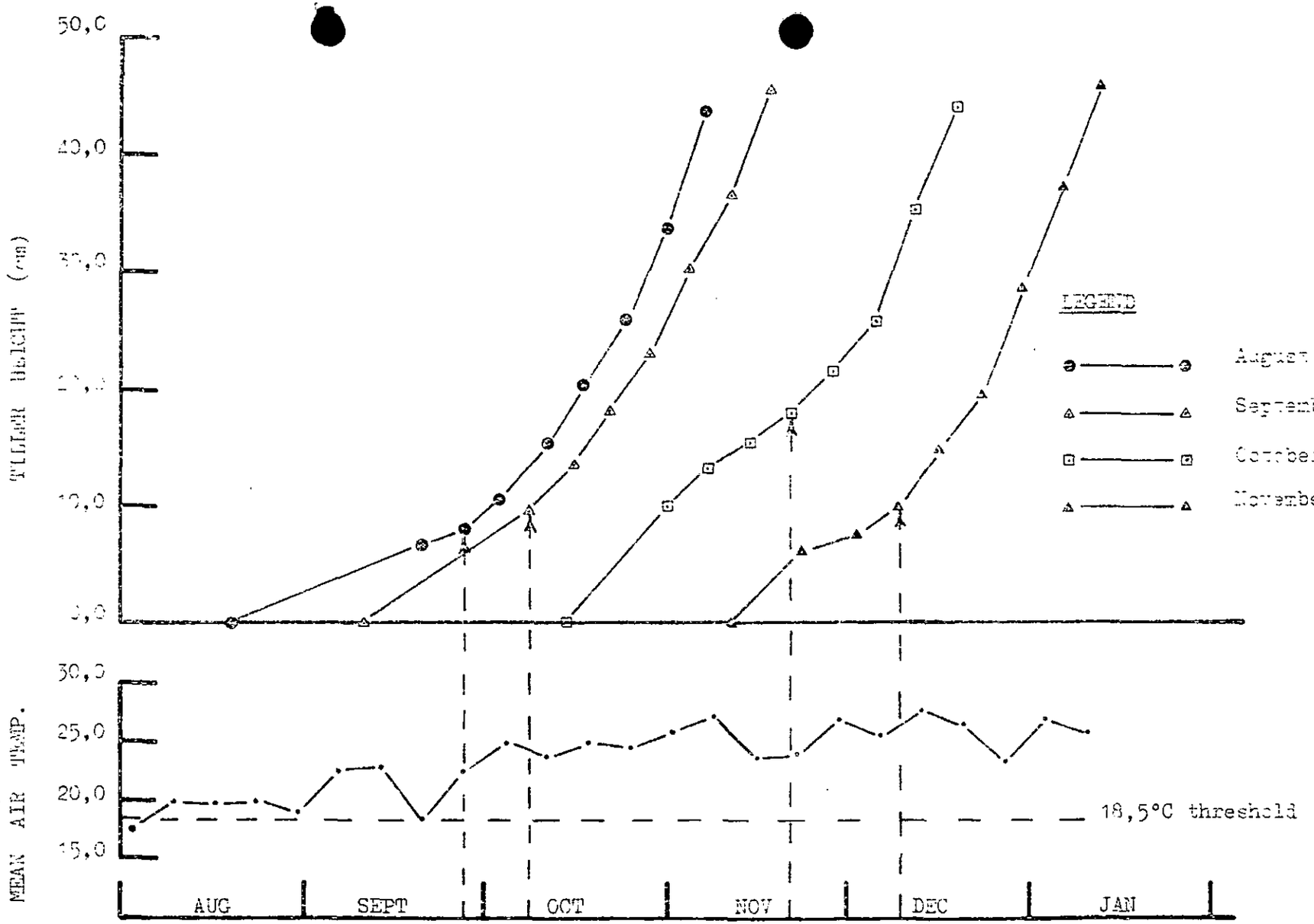


Figure 1 : Effect of mean air temperature on the onset of rapid stalk elongation in May, June and July harvests.



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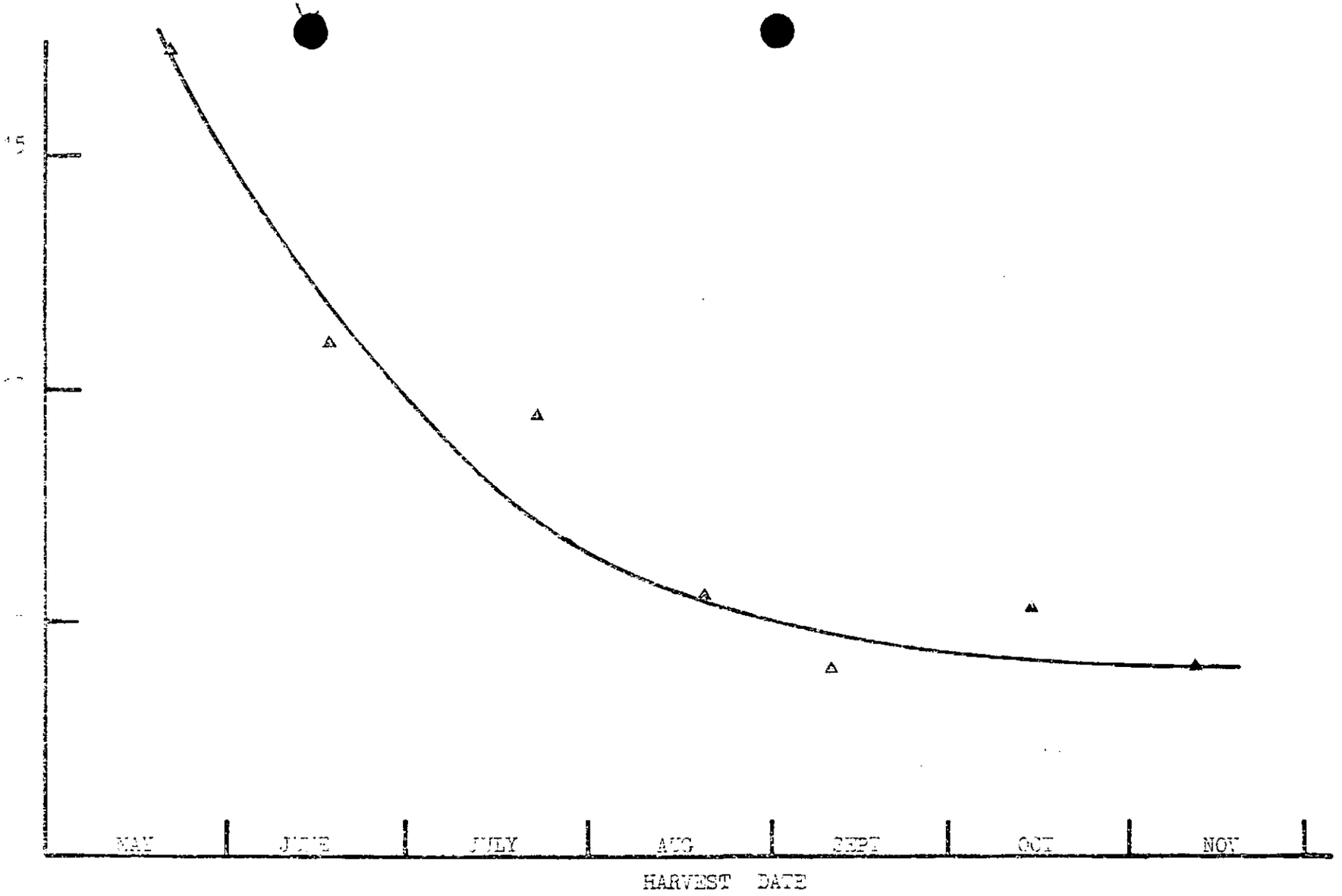

Figure 2 : Time taken to reach rapid stalk elongation phase for different harvest dates.

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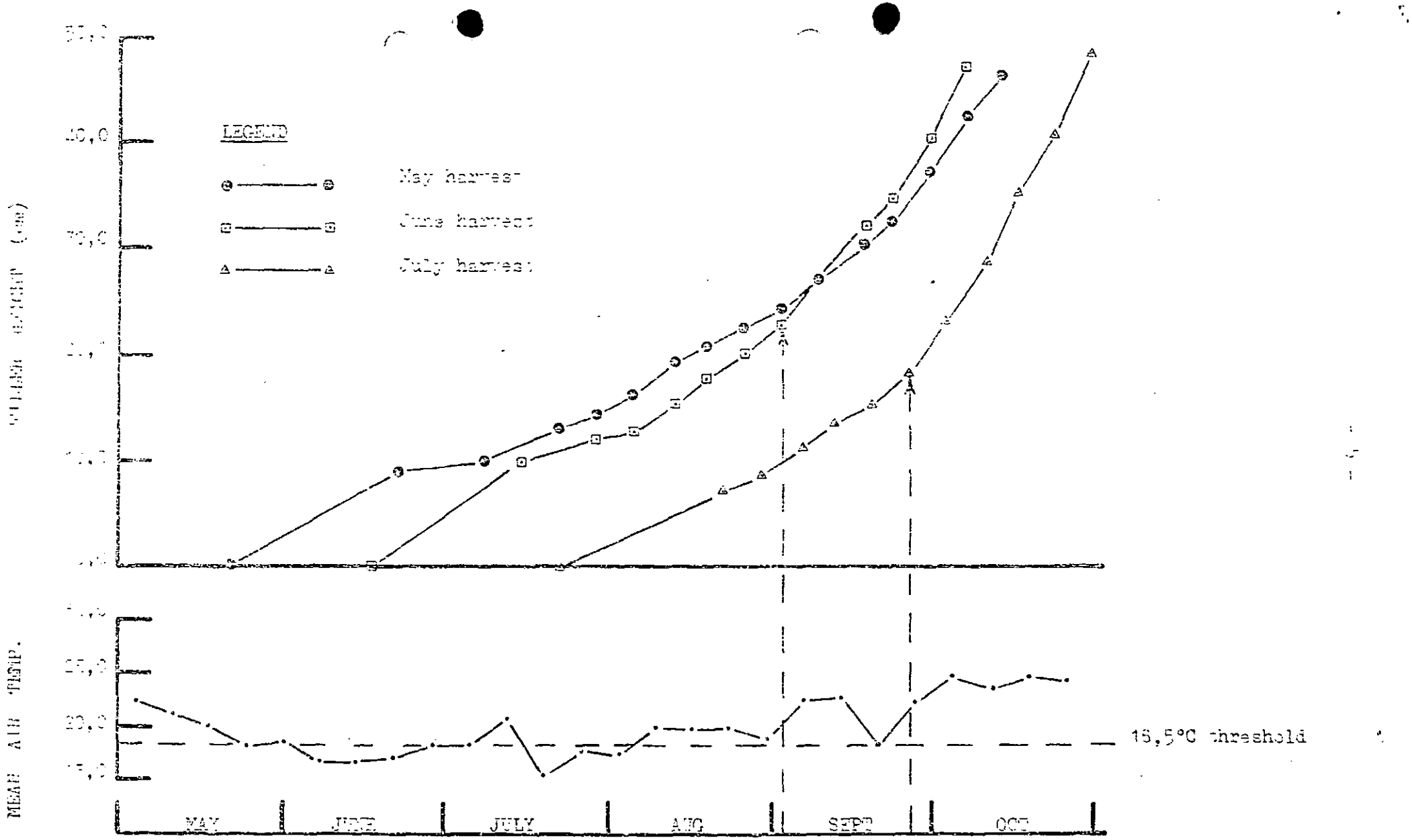

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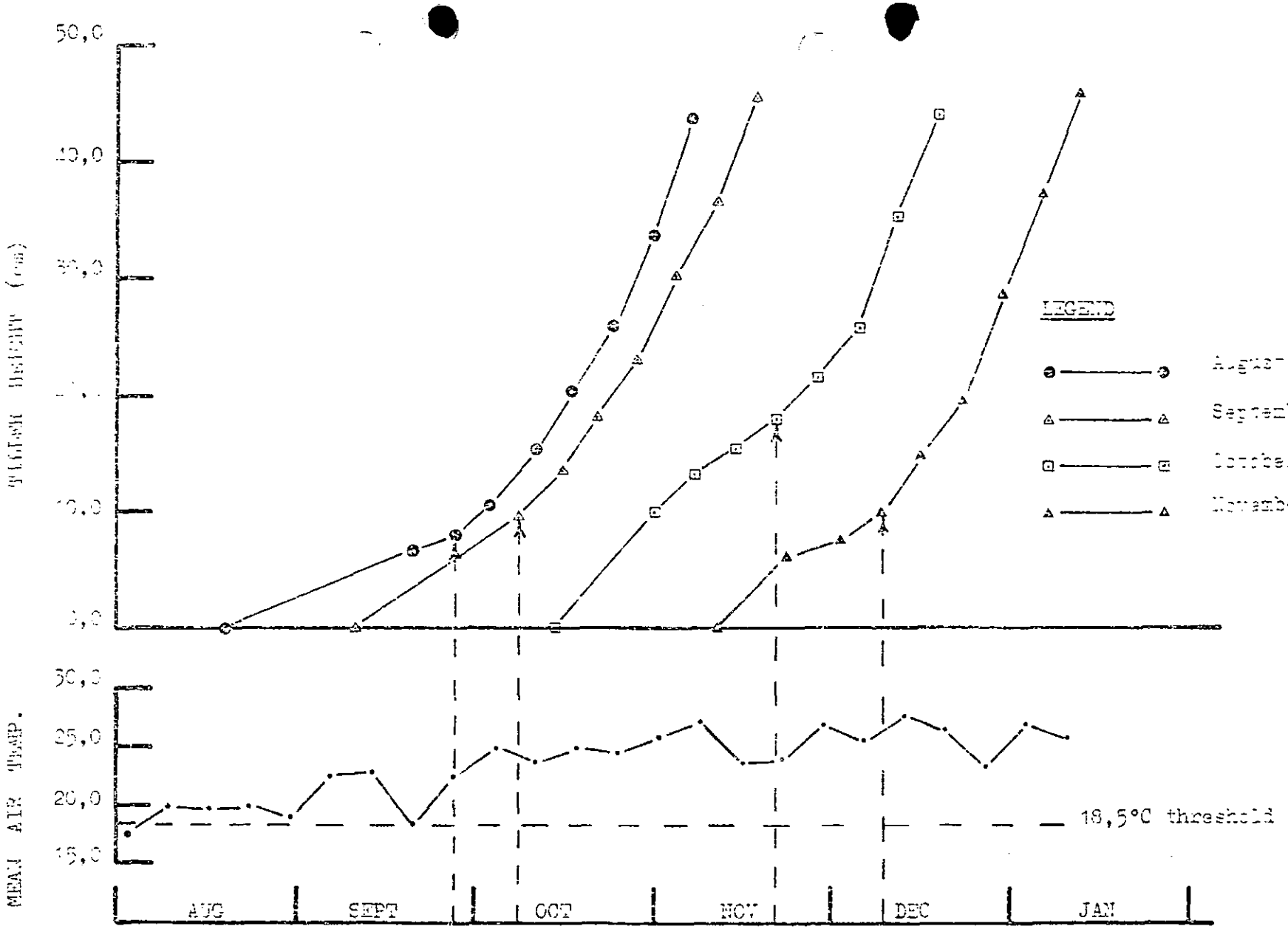

Figure 1 : Effect of mean air temperature on the onset of rapid stalk elongation b) August, September, October and November harvests.